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Cancel claim 42. Add claim 46 as follows:

~~46. The method of claim 44 wherein the toner particles and the material are of the same material selected from the group consisting of polyethylene, polypropylene, polystyrene, polycarbonate and acrylonitrile butadiene styrene.~~

### Remarks

The Office Action and prior art have been reviewed with care in preparing for this amendment and response. The Applicants appreciate the attention of the Examiner to the application.

Claims 26, 39 and 43 have been rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Office Action asserts that the original claims and specification provide no support for applying toner particles directly onto the thermoplastic material. The Examiner's attention is directed to page 4, lines 4-5 of the specification which states: "it is possible for the toner to be applied in its raw state directly to the surface of the material."

Claims 26, 39 and 43 have been rejected under 35 USC 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Office Action asserts that the original claims and specification provide no support for the limitation "whereby the thermoplastic material and toner form a single unsupported layer." Likewise, the same claims are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventors regard as the invention because the meaning of the limitation is unclear and undefined by the specification. Such limitation is herein deleted from all claims.

Claim 38 is rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventors

regard as the invention because it requires molding the thermoplastic material which claim 26 requires extruding the thermoplastic material. Claim 38 is herein amended to remove the term “molding machine.”

Claims 26-37 are rejected under 35 USC 103(a) as being unpatentable over GB1,264,494 in view of U.S. Patent No. 4,140,463 (Brinkmann). Claim 38 is rejected under 35 USC 103(a) as being unpatentable over GB1,264,494 in view of Brinkmann and in further view of U.S. Patent No. 4,162,884 (Vetter). Claims 39-45 are rejected under 35 USC 103(a) as being unpatentable over GB1,264,494 in view of Vetter. The 35 USC 103(a) rejections will be discussed as applied to each independent claim set.

#### **Claims 26-38**

Regarding claims 26-38 it is first noted that claim 26 requires a toner “consisting of a coloring agent and thermoplastic toner particles.” GB1,264,494 does not disclose or suggest such a toner. In fact, at lines 24-49 GB1,264,494 discloses that a toner incorporating only a thermoplastic material was inoperable due to low dielectric loss factors. Instead, GB1,264,494 requires a “toner comprising a pigment, a thermoplastic binder and a substance having a dielectric loss factor substantially higher...” (lines 66-69). The high dielectric loss factor (HDLF) substance is the crux of the GB1,264,494 invention. Therefore, the Office Action’s reliance on GB1,264,494 as teaching a toner consisting only of a coloring agent and thermoplastic toner particles is clearly erroneous.

Furthermore, GB1,264,494 discloses that the toner fixing step be carried out when “the copy material is placed within a cavity or hollow resonator which is tuned to the high frequency used and which has a configuration appropriate to the shape of the substrate on which the toner is to be fixed” (lines 76-81). GB1,264,494 does not provide that either the toner “be heated by the thermoplastic material upon contact with the thermoplastic material to reach the toner reactive state” (as required by claim 33), or that the toner be “heated to the toner reactive state and the thermoplastic material [be] brought to the material reactive state through contact with the toner” (as required by claim 34). Rather, GB1,264,494 expressly provides that the toner be applied to the substrate and then subjected to high-frequency resonance to melt the HDLF substance and dissolve the binder before fixing the toner image.

With more specific reference to the other dependent claims, GB1,264,494 does not suggest that “only a surface portion of the thermoplastic material [be] brought into the material reactive state” (claim 27) or that heat be applied “to at least the surface of the thermoplastic material to produce the reactive state” and “at least the surface of the thermoplastic material” be maintained “in the reactive state” (claim 38).

The Office Action asserts that one of ordinary skill in the art “would have recognized the various permutations of causing bonding of the toner to the substrate, including... heating either toner or substrate via heating from the other.” Applicants respectfully argue that such an assertion is neither supported nor correct and request a cite to a reference which supports such an assertion. Furthermore, the Applicants believe that the method required by GB1,264,494 and described above explicitly does not allow for the heating of one component by the other since GB1,264,494 specifically requires that the HDLF substance be melted by high-frequency resonance – not by thermal energy.

#### **Claims 39-42**

As amended, claim 39 requires that the thermoplastic material and thermoplastic toner particles be of the same composition such that they may form a consistent material composition after hardening. In addition, claim 39 requires that the toner be heated to a toner reactive state and the thermoplastic material be heated to a material reactive state before the toner is electrographically printed directly onto the thermoplastic material.

The Office Action asserts that one of ordinary skill in the art “would have recognized the various permutations of causing bonding of the toner to the substrate, including using the same thermoplastic for toner and substrate.” Applicants respectfully argue that such an assertion is neither supported nor correct and request a cite to a reference which supports such an assertion. Furthermore, the Applicants note that GB1,264,494 states that the HDLF substance melts the thermoplastic binder, does not state that the HDLF substance has any effect on the substrate. Applicants assert that use of the same thermoplastic composition as the substrate would be inoperable due to the solvency of the composition in the HDLF substance, e.g., the substrate would be dissolved when the HDLF is treated by high frequency resonance.

Claims 40 and 41 both include requirements which are addressed above in reference to claims 33 and 34. Such arguments supporting the patentability of claims 33 and 34 equally support the patentability of claims 40 and 41. Claim 42 is canceled since it is largely incorporated in the amended claim 39.

#### **Claims 43-46**

Amended claim 43 requires that the thermoplastic material be heated to a material reactive state before a toner is electrographically printed directly onto the thermoplastic material such that the toner is heated by the thermoplastic material and reaches a toner reactive state. After hardening the thermoplastic material to establish a bond between the toner and the thermoplastic material, the thermoplastic material and toner form a consistent material composition.

Again, it is noted that GB1,264,494 does not provide for heating of the substrate before application of the toner comprising pigment, binder and HDLF substance. Furthermore, such a method is not functional since GB1,264,494 requires that high frequency resonance be utilized to melt the HDLF substance, not thermal energy. Applicants have also added claim 46 which states that the toner particles and thermoplastic material are of the same material selected from the group consisting of polyethylene, polypropylene, polystyrene, polycarbonate and acrylonitrile butadiene styrene.

#### **Summary**

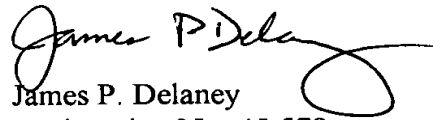
In summary, the combination of references cited neither disclose nor suggest several elements of the Applicants' invention. First, claim 26 requires that the toner consist only of a coloring agent and thermoplastic toner particles. This requirement is not found in the prior art references. Specifically, GB1,264,494 requires that its toner comprise at least a pigment, a thermoplastic binder and the HDLF substance which acts as a solvent for the binder.

Second, the combination does not teach heating such that both the thermoplastic material and the toner each reaches a reactive state. In fact, GB1,262,494 clearly would not allow such heating through its disclosed high frequency resonance.

Finally, the use of the same thermoplastic material for layer and toner particles is not an obvious variation of the combination of prior art references. GB1,264,494 requires a solvent to be used to allow the thermoplastic binder to be melted but does not contemplate dissolving the substrate since the substrate is not of the same material. None of the other cited references disclose use of thermoplastic materials in the toner. Therefore any combination of the references does not render obvious claims requiring the use of the same thermoplastic materials.

Applicants believe that all claims as amended are in proper form for allowance and early favorable action is requested. The Examiner is invited to call the undersigned attorney if that would be helpful in facilitating resolution of any issues which might remain.

Respectfully submitted,

  
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 2/10/03  
Signature Date

**Marked-up Version to Show Changes Made**

26. (twice amended) A method of printing on [an extruded] a thermoplastic material, the method comprising the steps of:

- electrographically printing a toner [consisting of a coloring agent and thermoplastic toner particles] directly onto the [extruded] thermoplastic material, the toner consisting of a coloring agent and thermoplastic toner particles;
- bringing the thermoplastic material into a material reactive state; and
- hardening the thermoplastic material thereby establishing a bond between the toner and the thermoplastic material[,

whereby the thermoplastic material and toner form a single unsupported layer].

38. (amended) The method of claim 26 wherein the thermoplastic material has a surface on which the toner is printed, the method further comprising the steps of:

- [• processing the thermoplastic material in a heated molding machine;]
- applying heat to at least the surface of the thermoplastic material to produce the reactive state;
- maintaining at least the surface of the thermoplastic material in the reactive state; and
- printing the toner onto the surface.

39. (twice amended) A method of printing on a [molded] thermoplastic material, the method comprising the steps of:

- heating a toner comprised of a coloring agent and thermoplastic toner particles of the same composition as the thermoplastic material to a toner reactive state;
- heating the [molded] thermoplastic material to a material reactive state;
- after the heating steps, electrographically printing the toner directly onto the <sup>heated</sup> thermoplastic material; and
- hardening the <sup>printed</sup> thermoplastic material thereby establishing a bond between the toner and the thermoplastic material,

whereby the thermoplastic material and toner form a [single unsupported layer] consistent material composition.

42. (canceled).

43. (twice amended) A method of printing on a molded thermoplastic material, the method comprising the steps of:

- heating the thermoplastic material to a material reactive state;
- electrographically printing a toner directly onto the molded thermoplastic material such that the toner is heated by the thermoplastic material and reaches a toner reactive state; and
- hardening the thermoplastic material thereby establishing a bond between the toner and the thermoplastic material,

whereby the thermoplastic material and toner form a [single unsupported layer] consistent material composition.

46. The method of claim 44 wherein the toner particles and the material are of the same material selected from the group consisting of polyethylene, polypropylene, polystyrene, polycarbonate and acrylonitrile butadiene styrene.